

### **REMARKS/ARGUMENTS**

Claims 15-34 are pending in the present application before this amendment as set forth above. By this amendment, claims 15, 18, 20-22, 29-31 and 33 are amended.

In the November 1, 2007 Office Action, the Primary Examiner rejected claims 15-21 and 27-32 under 35 U.S.C. §112, second paragraph, and claims 15-33 under 35 U.S.C. §103(a) as being unpatentable over Fukushima (JP 2002-020576). Additionally, the specification was objected to as failing to provide proper antecedent basis for the claimed subject matter.

Applicant very appreciates the Primary Examiner's careful review of the present application.

In response, as set forth above, claims 15, 18, 20-22, 29-31 and 33 have been amended for better form.

Applicant asserts that no new matter is added.

Any amendments to the claims not specifically referred to herein as being included for the purpose of distinguishing the claims from cited references are included for the purpose of clarification, consistence and/or grammatical correction only.

It is now believed that the application is in condition for allowance at least for the reasons set forth below and such allowance is respectfully requested.

The following remarks herein are considered to be responsive thereto.

### **Objection to the Specification**

In the Office action, the Primary Examiner objected to the specification as failing to provide proper antecedent basis for the claimed subject matter, and specifically asserted that the subject matter of claims 18-21 and 27-30 did not appear in the specification.

In response, applicant respectfully submits that *the specification*, as originally filed, *does disclose the subject matter of claims 18-21 and 27-30*.

For example, the limitations of claims 18, 19, 27 and 28 are disclosed at least in the paragraphs from page 4, lines 22-35, through page 5, lines 1-11 of the specification, as originally filed, i.e., "the *olefin (co)polymer* is a homopolymer of a *nonpolar  $\alpha$ -olefin monomer* or a

copolymer of two or more ***nonpolar  $\alpha$ -olefin monomers***, obtained by high-pressure radical polymerization, medium-pressure or low-pressure ionic polymerization, or the like.

Examples of the ***nonpolar  $\alpha$ -olefin monomer*** include ethylene, propylene, 1-butene, 1-pentene, 1-hexene, and 4-methyl-1-pentene. Of these, ethylene and propylene are preferable.

Specific examples of ***the olefin (co)polymer*** include low-density polyethylene, very low-density polyethylene, ultralow-density polyethylene, low-molecular-weight polyethylene, polypropylene, and an ethylene-propylene copolymer. Of these, polypropylene and an ethylene-propylene copolymer are preferable from the viewpoint of oil resistance and mechanical properties. ***An oil-resistant ethylene-propylene copolymer is particularly preferable.*** The oil-resistant ethylene-propylene copolymer is homopolypropylene, an ethylene-propylene block copolymer with ethylene content of 10 wt % or less, or an ethylene-propylene random copolymer with ethylene content of 5 wt % or less. A mixture of two or more such olefin (co)polymers may also be used.” (Emphasis added.)

Additionally, the limitations of claims 20 and 29 are disclosed at least in the paragraph of page 21, lines 15-22 of the specification, as originally filed, i.e., “***at least one additive*** selected from the ***group consisting of a plasticizer, an extender, a lubricant, and an antioxidant*** may be added to the olefinic thermoplastic elastomer.” (Emphasis added.)

Furthermore, the limitations of claims 21 and 30 are disclosed at least in the paragraphs from page 24, lines 16-35 through page 25, lines 1-4 of the specification, as originally filed, for example, “without departing from the scope of the present invention, ***other thermoplastic resins or rubbers may be added to the olefinic thermoplastic elastomer.***”

Examples of ***the other thermoplastic resins or rubbers*** include engineering plastics, such as a polyamide resin, polyester resin, polyacetal resin, polycarbonate resin, polyphenylene ether resin, and polyallylate resin; olefin resins, such as an ethylene-ethyl acrylate copolymer and an ethylene-glycidyl methacrylate copolymer; styrene resins, such as polystyrene resin, high-impact polystyrene resin, and an acrylonitrile butadiene styrene resin; general-purpose plastics, such as an acrylic resin and a vinyl chloride resin; thermoplastic elastomers, such as an ester thermoplastic elastomer, styrene thermoplastic elastomer, olefinic thermoplastic elastomer, urethane thermoplastic elastomer, amide thermoplastic elastomer, and polybutadiene

thermoplastic elastomer; synthetic rubbers, such as butadiene rubber, butadiene-styrene rubber, butadiene-acrylonitrile rubber, chloroprene rubber, hydriin rubber, butyl rubber, ethylene-propylene copolymer rubber, urethane rubber, silicon rubber, fluorine rubber, silicone rubber, and acrylic rubber; and natural rubber.” (Emphasis added.)

Therefore, applicant respectfully submits that the subject matter of claims 18-21 and 27-30 is disclosed in the specification, as originally filed. Accordingly, applicant respectfully requests the objection to the specification be withdrawn.

### **Claim Rejections - 35 U.S.C. §112**

In the November 1, 2007 Office Action, the Primary Examiner rejected claims 15-21 and 27-32 under 35 U.S.C. §112, second paragraph.

In response, as set forth above, claims 18, 20, 21, 27, 29 and 30 have been amended to replace the term “ingredient” with “ingredients”, which is anteceded in independent claims 18 and 15 and 22, respectively. Therefore, the §112 rejections to claims 18-21 and 27-30 have been overcome.

Additionally, independent claims 15, 22, 31 and 33 have been amended to clarify the polyphase (multiphase) dispersion structure of the graft copolymer in which one of the segments forming a dispersion phase and the other forming a matrix phase (continuous phase). Therefore, the §112 rejections to claims 15-21, 31 and 33 have been overcome.

### **Claim Rejections - 35 U.S.C. §103**

Claims 15 to 33 were rejected under 35 USC 103(a) as being unpatentable over Fukushima in the November 1, 2007 Office Action. Applicant respectfully traverses the rejection made by the Primary Examiner at least for the reasons set forth below.

#### **Claims 15-21:**

Claim 15, as amended, recites an olefinic thermoplastic elastomer obtained by melting and kneading ingredients, where the ingredients include:

“*a graft copolymer* composed of an olefin homo/co-polymer segment formed from a nonpolar  $\alpha$ -olefin monomer, and a vinyl copolymer segment, wherein the graft copolymer has a polyphase structure in which one of the olefin homo/co-polymer segment and the vinyl copolymer segment form a dispersed phase in the other with a particle size of 0.01 to 1  $\mu\text{m}$ ;

*an acrylic rubber* formed from a monomer mixture in which **10 to 90 wt% of methoxyethyl acrylate, 5 to 85 wt% of alkyl acrylate, 5 to 15 wt% of acrylonitrile, and 0.1 to 10 wt% of allyl methacrylate** are contained as main ingredients;

**0.01 to 10 wt% of a crosslinking agent** with respect to the total amount of the graft copolymer and the acrylic rubber; and

**0.01 to 10 wt% of a co-crosslinking agent** with respect to the total amount of the graft copolymer and the acrylic rubber.” (Emphasis added.)

The combination of the claimed ingredients compounded in the claimed amount can improve at least oil resistance and compression set. The notable progress is further shown in the supplemental experiment results, which are attached following the Remarks/Arguments of this response.

Fukushima does not disclose, teach or suggest the ingredients and amount of each ingredient as recited in amended claim 15. Based on Fukushima, a practitioner having an ordinary skill in the art cannot expect that the combination of the claimed ingredients compounded in the claimed amounts can improve at least oil resistance and compression set. Amended claim 15 achieves surprising and unexpected results that cannot be anticipated from Fukushima.

Therefore, for at least the foregoing reasons, amended claim 15 is patentable under 35 U.S.C. §103(a) over Fukushima.

Accordingly, claims 16-21, which depend from now allowable amended claim 15, are patentable at least for this reason.

**Claims 22-30:**

Claim 22, as amended, recites an olefinic thermoplastic elastomer obtained by melting and kneading ingredients, where the ingredients include:

“*a grafting precursor* composed of particles of an olefin homo/co-polymer formed from a nonpolar  $\alpha$ -olefin monomer, and a copolymer of a vinyl monomer and a radically polymerizable organic peroxide, the copolymer being dispersed in the particles;

*an acrylic rubber* formed from a monomer mixture in which **10 to 90 wt% of methoxyethyl acrylate, 5 to 85 wt% of alkyl acrylate, 5 to 15 wt% of acrylonitrile, and 0.1 to 10 wt% of allyl methacrylate** are contained as main components;

**0.01 to 10 wt% of a crosslinking agent** with respect to the total amount of the grafting precursor and the acrylic rubber; and

**0.01 to 10 wt% of a co-crosslinking agent** with respect to the total amount of the grafting precursor and the acrylic rubber.” (Emphasis added.)

Referring to and incorporating herewith the reasons why amended claim 15 is patentable under 35 U.S.C. §103(a) over Fukushima, amended claim 22 is also patentable under 35 U.S.C. §103(a) over Fukushima.

Accordingly, claims 23-30, which depend from now allowable amended claim 22, are patentable at least for this reason.

**Claims 31 and 32:**

Claim 31, as amended, recites a molding obtained by molding an olefinic thermoplastic elastomer obtained by melting and kneading ingredients, where the ingredients include:

“*a graft copolymer* composed of an olefin homo/co-polymer segment formed from a nonpolar  $\alpha$ -olefin monomer, and a vinyl copolymer segment, wherein the graft copolymer has a polyphase structure in which one of the olefin homo/co-polymer segment and the vinyl copolymer segment form a dispersed phase in the other with a particle size of 0.01 to 1  $\mu\text{m}$ ;

*an acrylic rubber* formed from a monomer mixture in which **10 to 90 wt% of methoxyethyl acrylate, 5 to 85 wt% of alkyl acrylate, 5 to 15 wt% of acrylonitrile, and 0.1 to 10 wt% of allyl methacrylate** are contained as main ingredients;

**0.01 to 10 wt% of a crosslinking agent** with respect to the total amount of the graft copolymer and the acrylic rubber; and

***0.01 to 10 wt% of a co-crosslinking agent*** with respect to the total amount of the graft copolymer and the acrylic rubber.” (Emphasis added.)

Referring to and incorporating herewith the reasons why amended claim 15 is patentable under 35 U.S.C. §103(a) over Fukushima, amended claim 31 is patentable under 35 U.S.C. §103(a) over Fukushima, as well.

Accordingly, claim 32, which depends from now allowable amended claim 31, is patentable at least for this reason.

**Claims 33 and 34:**

Claim 33, as amended, recites a molding obtained by molding an olefinic thermoplastic elastomer obtained by melting and kneading ingredients, where the ingredients include:

“***a grafting precursor*** composed of particles of an olefin homo/co-polymer formed from a nonpolar  $\alpha$ -olefin monomer, and a copolymer of a vinyl monomer and a radically polymerizable organic peroxide, the copolymer being dispersed in the particles;

***an acrylic rubber*** formed from a monomer mixture in which ***10 to 90 wt% of methoxyethyl acrylate, 5 to 85 wt% of alkyl acrylate, 5 to 15 wt% of acrylonitrile, and 0.1 to 10 wt% of allyl methacrylate*** are contained as main components;

***0.01 to 10 wt% of a crosslinking agent*** with respect to the total amount of the grafting precursor and the acrylic rubber;

***0.01 to 10 wt% of a co-crosslinking agent*** with respect to the total amount of the grafting precursor and the acrylic rubber.” (Emphasis added.)

Referring to and incorporating herewith the reasons why amended claim 15 is patentable under 35 U.S.C. §103(a) over Fukushima, amended claim 33 is also patentable under 35 U.S.C. §103(a) over Fukushima.

Accordingly, claim 34, which depends from now allowable amended claim 32, is patentable at least for this reason.

**CONCLUSION**

Applicant respectfully submits that the foregoing Amendment and Response place this application in condition for allowance. If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any informalities that can be corrected by an Examiner's amendment, please call the undersigned at 404-495-3678.

Respectfully submitted,

MORRIS, MANNING & MARTIN, LLP

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Tim Tingkang Xia  
Attorney for Applicant on the Record  
Reg. No. 45,242

MORRIS, MANNING & MARTIN, LLP  
1600 Atlanta Financial Center  
3343 Peachtree Road, N.E.  
Atlanta, Georgia 30326-1044  
Phone: 404-233-7000  
Direct: 404-495-3678  
**Customer No. 24728**

## SUPPLEMENTAL EXPERIMENTS

To further support the foregoing arguments, applicant respectfully submits newly-performed supplemental experiments (refer to as Comparative Examples 5 and 6).

### Comparative Example 5

The same operation as in Example 1 described in the specification, as originally filed, was carried out, except that the acrylic rubber C obtained in Reference Example 3 was used in place of the acrylic rubber A. Ingredients and physical properties of the elastomers of Comparative Example 5 are shown in Supplemental Table 1.

### Comparative Example 6

The same operation as in Example 1 was carried out, except that the acrylic rubber D obtained in Reference Example 4 was used in place of the acrylic rubber A. Ingredients and physical properties of the elastomers of Comparative Example 6 are shown in Supplemental Table 1.

Acrylic rubber A is one example of the acrylic rubber recited in amended claims 15 and 22. Acrylic rubbers C and D ***are not*** the acrylic rubber recited in amended claims 15 and 22. See Table 1 in the specification, as originally filed.

As shown in Supplemental Table 1, comparison of Example 1 with Comparative Examples 5 and 6 clearly demonstrates the fact that the use of the acrylic rubber that is formed from a monomer mixture in which ***10 to 90 wt% of methoxyethyl acrylate, 5 to 85 wt% of alkyl acrylate, 5 to 15 wt% of acrylonitrile, and 0.1 to 10 wt% of allyl methacrylate*** are contained as main ingredients improves mechanical properties, such as ***compression set and oil resistance***.. This fact can also be understood from comparison of Example 6 with Comparative Example 3. See Supplemental Table 2. A person of ordinary skill in the art cannot expect this fact from the disclosure of Fukushima. Therefore, amended claims 15 and 22 are patentable over Fukushima.



Supplemental Table 1

		Example 1	Comp. Example 5	Comp. Example 6
Ingredients	Acrylic rubber A	1800	-	-
	Acrylic rubber B	-	-	-
	Acrylic rubber C	-	1800	-
	Acrylic rubber D	-	-	1800
	Grafting precursor a	600	600	600
	Grafting precursor b	-	-	-
	Grafting precursor c	-	-	-
	Perhexa 25B	15	15	15
	Perbutyl P	-	-	-
	BPE-200	30	30	30
Properties	Hardness (sha)	80	82	77
	Tensile strength (mpa)	6.2	6.5	4.4
	Fracture elongation (%)	300	310	210
	<i>Compression set (%)</i>	<i>45</i>	<i>52</i>	<i>65</i>
	<i>Oil resistance (weight change (%))</i>	<i>12</i>	<i>19</i>	<i>22</i>
	Heat resistance (fracture elongation (%))	200	200	150
	Appearance	○	○	○
	MFR (g/10min)	35	36	85

Supplemental Table 2

		Example 6	Comp. Example 3
Ingredients	Acrylic rubber A	1650	-
	Acrylic rubber B	-	-
	Acrylic rubber C	-	1650
	Acrylic rubber D	-	-
	Grafting precursor a	550	550
	Grafting precursor b	-	-
	Grafting precursor c	-	-
	Perhexa 25B	-	
	Perbutyl P	15	15
	Ethyleneglycol dimethacrylate	30	30
	Dibutyldiglycol adipate	400	400
	Polypropylene E	200	200
Properties	Irganox 1010	30	30
	Hardness (ShA)	75	78
	Tensile strength (mpa)	5.5	5.7
	Fracture elongation (%)	280	300
	<b>Compression set (%)</b>	<b>43</b>	<b>52</b>
	<b>Oil resistance (weight change (%))</b>	<b>4</b>	<b>10</b>
	Heat resistance (fracture elongation (%))	270	270
	Appearance	☉	☉
	MFR (g/10min)	20	25